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Surgical Management of Minor Salivary Gland Neoplasms of the Palate

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ABSTRACT

Objective: Minor salivary gland tumors are uncommon, accounting for up to 15% of salivary gland neoplasms. We describe our experience with both benign and malignant tumors of the palatal minor salivary glands, focusing on the extent of resection and options for defect reconstruction.

Study Design: Retrospective review of medical records.

Results: From 1994 to 2002, 37 patients with primary neoplasms originating in the palatal minor salivary glands were treated at a single institution. Patients ranged in age from the second to the seventh decades, with a female preponderance. Twenty-four percent of the lesions were benign. The most common malignant tumor encountered was low grade polymorphous adenocarcinoma, followed by mucoepidermoid carcinoma, and adenoid cystic carcinoma. The extent of surgical resection was dictated by tumor pathology and evidence of perineural spread, and defects were reconstructed with a variety of techniques. Postoperative complications included velopharyngeal insufficiency, flap fistulization or loss, and trismus. After 1 month to 8 years of follow-up, 1 patient has died with regional and systemic metastases.

Conclusions: Neoplasms of the minor salivary glands in the palate may be excised, with limits dictated by tumor histopathology and perineural invasion. Improved functional results may be achieved by immediately reconstructing the defects with rotational flaps, reserving free flaps for more extensive defects of the maxilla and infratemporal fossa.

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Key Words: Palate, salivary gland neoplasms

INTRODUCTION

Although 450 to 750 minor salivary glands are present in the head and neck, minor salivary gland tumors remain relatively uncommon neoplasms.[1] Because the highest concentration of these glands has been described as on the palate, particularly the junction of the hard and soft palates, it is not surprising that most minor salivary gland tumors occur at this site.[2,3] In all, 8% to 15% of salivary gland tumors arise in the palate, and these tumors are malignant in 40% to 82% of cases.[1,3–5] The incidence of malignancy in minor salivary gland tumors appears to follow the general principle that tumors in smaller salivary glands are more likely to be malignant than their counterparts in the major or paired glands.

Given the propensity for malignant histology in minor salivary gland tumors, the management of these lesions is predicated upon adequate surgical resection to maximize the ultimate oncologic result. However, the surgical zeal for wide margins must be tempered by the realization that tumor aggressiveness varies with histologic subtype, as well as an appreciation of the cosmetic and functional sequellae of palate defects. Traditionally, reconstruction of defects resulting from the extirpation of these lesions has received little attention, as local flaps and obturators have been the prime modalities of defect management.[5] Advances in reconstructive techniques, including free tissue transfer and pedicled flaps, have expanded the head and neck surgeon's armamentarium. By reviewing our experience with these lesions, we seek to identify the factors that suggest more aggressive histology to aid in preoperative planning. We then advocate an aggressive

surgical approach that is tailored not only to the tumor type but also to the likelihood of local or perineural spread, usually followed by primary reconstruction performed to maximize the ultimate functional result.

MATERIALS AND METHODS

After gaining approval from the Vanderbilt Institutional Review Board, the medical records of all patients who underwent resection of palate lesions and reconstruction of palate defects from 1994 to 2002 were retrospectively reviewed. Patients with epithelial or metastatic lesions were excluded, leaving a total of 37 patients for analysis. Hospital and clinic records were then studied, focusing on patient demographics, comorbidities, and the duration and nature of presenting symptoms.

The precise anatomic location and appearance of the lesions were noted, as was the gross extension into surrounding structures. Specimens were reviewed to determine histopathologic type and the status of margins, including nerve margins. The extent of surgical resection was recorded, along with any concomitant procedures, and the reconstructive method was noted. We then documented the length of stay, time to initiation of an oral diet, a subjective assessment of speech and swallowing function by the patient, and the incidence of complications in the postoperative period. The length of patient follow-up, documented recurrences, and last known disease status were also gathered for each patient. Data were tabulated and analyzed using Excel 97 (Microsoft Corporation, Redmond, Wash.), with statistical analysis using Fischer's exact test performed with GraphPad Prism version 3.00 for Windows (GraphPad Software, San Diego, Calif.).

RESULTS

Since 1994, 37 patients have undergone surgical management of minor salivary gland tumors arising from the palate. The patients ranged in age from 15 to 81 years, with a mean of 48.1. There were 20 women included in the study, compared to 17 men. Postoperatively, patients were followed from 1 to 96 months, with an average of 22.2 months of documented clinical follow-up. The majority of patients (57%) were otherwise healthy non-tobacco users, but numerous patients exhibited other comorbidities, such as hypertension, hypercholesterolemia, hypothyroidism, and gastroesophageal reflux disease. A history of ongoing tobacco use was found in 10 patients, comprising the most common potential risk factor. However, there was no statistically significant association between tobacco use and malignant histology in our cohort. No patient had a history of prior radiation exposure to the head and neck.

Table 1. Tumor Histopathology

Diagnosis	Number of Patients (%) (n = 37)
Benign	9 (24)
Pleomorphic adenoma	8 (22)
Monomorphic adenoma	1 (3)
Malignant	28 (76)
Low grade polymorphous adenocarcinoma	10 (27)
Mucoepidermoid carcinoma	8 (22)
Low grade	3
Intermediate grade	5
Adenoid cystic carcinoma	7 (19)
Adenocarcinoma	2 (5)
Carcinoma ex pleomorphic	1 (3)

Tumor histopathology for our patients is summarized in Table 1. The majority (76%) of tumors was malignant, and low grade polymorphous adenocarcinoma comprised the most frequently encountered tissue diagnosis, followed by mucoepidermoid carcinoma and adenoid cystic carcinoma. Among the benign tumors, pleomorphic adenoma was the most common, accounting for 89% of all benign lesions.

Nineteen tumors (51%) were detected by the patient as an asymmetric swelling of the palate (Figure 1). Surprisingly, 13 tumors (35%) were completely asymptomatic and were detected only on routine dental examination. Other symptoms encountered included pain, ulceration, and dysesthesias. Presenting symptoms are depicted in Table 2. Although most tumors were symptomatic at the time of diagnosis, the symptoms (or at least knowledge of its presence from detection on a dental examination)

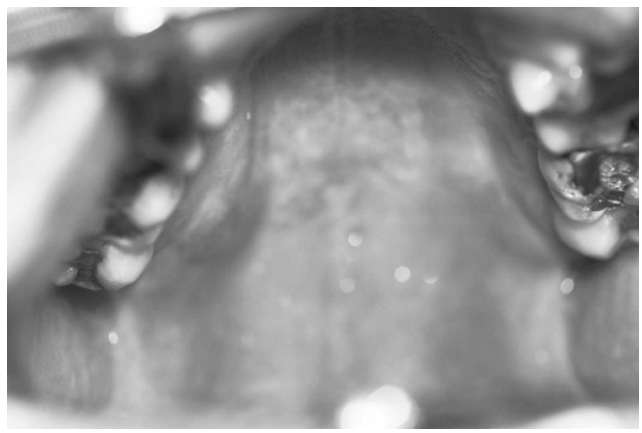

Figure 1. Submucosal mass on the right hard palate, near the junction of the hard and soft palates. A painless swelling of the palate is the most common presenting symptom for tumors of the palatal minor salivary glands.

Table 2. Presenting Symptoms and Corresponding Pathology

Histopathology	Symptoms			
	Swelling/Mass	Pain/Dysesthesia	Ulceration	Asymptomatic
Low grade polymorphous adenocarcinoma	7	0	1	2
Mucoepidermoid carcinoma	3	0	0	5
Adenoid cystic carcinoma	3	4	0	2
Adenocarcinoma	1	1	0	0
Carcinoma ex pleomorphic	1	0	0	0
Pleomorphic adenoma	4	1	0	3
Monomorphic adenoma	0	0	0	1

were present from 1 month to 40 years, with an average of 32.1 months, prior to evaluation by a head and neck surgeon. Both pain alone ($P = .0374$) and neural complaints including pain and dysesthesias ($P = .0068$) exhibited a statistically significant association with a histopathologic diagnosis of adenoid cystic carcinoma. No other symptoms or symptom duration demonstrated a clear relationship with tumor type.

On examination, 29 tumors (78%) involved the hard palate, and 17 (46%) occupied the junction between the hard and soft palates, often extending to the region of the greater palatine foramen. One lesion was found to encompass the entire palate, both hard and soft. Grossly, 90% of tumors were well circumscribed, and central ulceration was appreciated in 41%, reflecting either prior incisional biopsy or central tumor necrosis. Table 3 depicts the distribution of minor salivary gland tumors of the palate by subsite. While 21 lesions (57%) were localized to the palate, the remainder extended to involve one or more of several surrounding structures, including the maxillary alveolus, tonsil, nasopharynx, and sinonasal cavities. Submucosal extension into the nasal floor or the maxillary sinus was only identified with malignant tumors. Data on tumor size were incomplete, but available records indicate that tumors ranged in size from 1.57 cm^2 to 16 cm^2. The lack of uniform measurements and data entry precludes statistical analysis of tumor size as it relates to pathology, the extent of surgical resection, and reconstruction options.

Table 3. Tumor Location

Location	Number of Patients (%) (n = 37)
Hard palate	12 (32)
Soft palate	7 (19)
Hard/Soft palate junction	17 (46)
Transpalatal	1 (3)

Nineteen patients (51%) required partial palatectomy for extirpation of both benign and malignant disease, with resection of the soft tissues and either resection or exenteration of the underlying bone with a drill. Meanwhile, 10 patients with malignant tumors, evenly distributed between adenoid cystic carcinoma, mucoepidermoid carcinoma, and low grade polymorphous adenocarcinoma, each underwent some form of infrastructure maxillectomy. Dissection of the infratemporal fossa was performed in 7 patients (all of whom also underwent infrastructure maxillectomy) due to gross extension or evidence of perineural spread along branches of the fifth cranial nerve. One patient with local extension of an adenoid cystic carcinoma to the tonsil and lateral pharyngeal wall required a composite resection of these structures. Wide local excision was performed for 7 lesions, including 2 low grade mucoepidermoid carcinomas. The vast majority (92%) of tumors was excised through transoral approaches; 2 patients with gross nasopharyngeal extension required a midline mandibulotomy and one with contiguous spread into the ethmoid sinuses merited a lateral rhinotomy approach. Because the cancer had not spread to the lymph nodes at the time of presentation, routine neck dissections were not performed. However, the 5 patients who required free tissue transfer to reconstruct their palate defects underwent ipsilateral selective neck dissection for vessel access, and 1 patient was found to have cervical metastasis of an adenoid cystic carcinoma.

Surgical margins were ultimately negative in 36 patients (97%); 1 patient with an aggressive adenoid cystic carcinoma was found to have residual microscopic disease at the bony Eustachian tube and the soft tissues of the infratemporal fossa despite negative nerve margins. As has become our practice, frozen sections were commonly sent from the greater palatine nerve to detect evidence of perineural invasion of malignant tumors (Figures 2 and 3). In this cohort, perineural spread was evaluated by frozen

Figure 2. Resected tumor specimen (low grade mucoepidermoid carcinoma). Note the well-circumscribed appearance of this lesion, as well as the attached distal stump of the greater palatine neurovascular bundle.

section analysis in 17 patients and identified in 5 patients. In these patients, consisting of 4 cases of adenoid cystic carcinoma and 1 case of low grade polymorphous adenocarcinoma, the greater palatine nerve was always positive for perineural spread. Perineural invasion was also identified along the infraorbital nerve in the infratemporal fossa, and in the maxillary trunk of the trigeminal nerve at foramen rotundum. There was a statistically significant association between adenoid cystic histology and perineural invasion ($P = .0025$).

The resultant surgical defects were managed with a variety of techniques, as is evinced in Table 4. Pedicled flaps, most commonly a palatal island flap based on the contralateral greater palatine vessels, provided the most frequently employed method. Smaller, more superficial wounds arising from wide local excision or conservative partial palatectomy were allowed to granulate. Free flaps, either radial forearm or lateral arm flaps were used in 5 patients, all of which required reconstruction of a portion of the maxilla (Figures 4 and 5). Extension of the surgical defect into the infratemporal fossa or onto the lateral pharyngeal wall also provided the impetus for free tissue transfer. All patients who required infratemporal fossa dissection were reconstructed with either a free flap or a pedicled flap, but flap complications occurred more frequently in those who did not undergo free tissue transfer. However, this difference is not statistically significant.

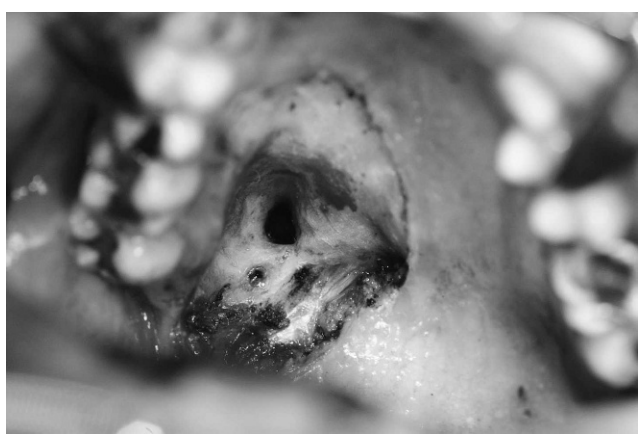

Figure 3. Surgical defect arising from Figure 2. There is no gross evidence of bone invasion or widening of the greater palatine foramen.

Postoperatively, most patients did well, as only 8 complications were encountered. The average of length of stay for each reconstructive method is listed in Table 5. There is no statistically significant difference in the length of hospitalization for those patients who merely received a palatal or palatomaxillary obturator compared to those who underwent pedicled flap reconstruction of their wounds. As expected, patients whose wounds were allowed to granulate had the shortest hospital courses, with the majority of procedures performed on an outpatient basis. Similarly, patients requiring free flap reconstruction had the longest hospital stays, averaging 9.4 days. Regardless of reconstructive method, most patients (95%) were discharged on oral diets. The 2 patients who were sent home with tube feeds for 2 to 3 weeks had undergone extensive palatal resections with flap reconstruction (1 palatal island flap and 1 radial forearm free flap). Six patients received postoperative radiation therapy, including 5 patients with adenoid cystic carcinoma and one with intermediate grade mucoepidermoid carcinoma. Although precise data on radiation fields and dosimetry are unavailable, the indications for radiation therapy in this series were positive margins, perineural invasion, and pathologic evidence of neck metastases.

Complications were infrequently encountered, occurring in less than 25% of cases, and wound complications were the most common. Velopharyngeal insufficiency deemed secondary to flap breakdown or fistulization occurred in 4 patients, although simple closure or obturation of the defect proved sufficient in all cases. Additionally, 3 patients developed Eustachian tube dysfunction manifest as serous otitis media ipsilateral to the side of greatest dissection in the infratemporal fossa. This was readily managed with myringotomy and tube placement. Finally, 2 patients, both of whom underwent temporalis myofascial flap reconstruction of their defects, developed severe trismus requiring manipulation under general anesthesia or the use of dental appliances. At the time of last evaluation, 1 patient with carcinoma ex pleomorphic had died with regional and systemic metastases, although he had no

Table 4. Reconstruction Methods and Complications

Technique	Number of Patients (n = 37)	Surgical Defect	Complications (#)
Obturator	4 total	Hemimaxillectomy	None
	3		
	1	Partial palatectomy	
Primary closure	3 total	Partial palatectomy (soft tissue +/− bone)	None
Secondary intention	10 total		
	5	Wide local excision	None
	5	Partial palatectomy	None
Local rotation	2 total	Partial palatectomy	None
Pedicled flaps	13 total		
Palatal island	10		
	2	Wide local excision	None
	5	Partial palatectomy	None
	3	Partial maxillectomy with ITF dissection	Flap loss (1), Fistula (2), VPI (2)
Temporalis	2	Hemimaxillectomy	VPI (1), trismus (2)
Submental	1	Partial maxillectomy with ITF dissection	None
Free tissue transfer	5 total		
Radial forearm	3	Hemimaxillectomy	None
		Partial maxillectomy/ITF dissection	VPI, fistula (closed)
		Composite resection including tonsil, SP	None
Lateral arm	2	Maxillectomy/ITF dissection	None

ITF = infratemporal fossa; VPI = velopharyngeal insufficiency; SP = soft palate.

evidence of disease at the primary site. No other mortality was encountered during the study period. Only one recurrence was documented, and it occurred in a benign tumor. Our patient with the monomorphic adenoma experienced a local recurrence at the primary site 3 months after the initial procedure. The lesion was re-resected with wider margins, and she remains without evidence of recurrent disease more than 5 years since the second procedure.

DISCUSSION

Tumors of the minor salivary glands comprise less than 2% of all tumors of the head and neck, and 37% to 48% of these arise from the palate.[2,6–8] Minor salivary gland tumors have also been described in the upper lip, buccal mucosa, pharynx, larynx, nasal cavities, and sinuses.[4,9] Minor salivary gland tumors of the hard palate have a propensity to arise at the junction of the hard and soft palates, followed by the hard palate, as in our series. Similarly, other studies

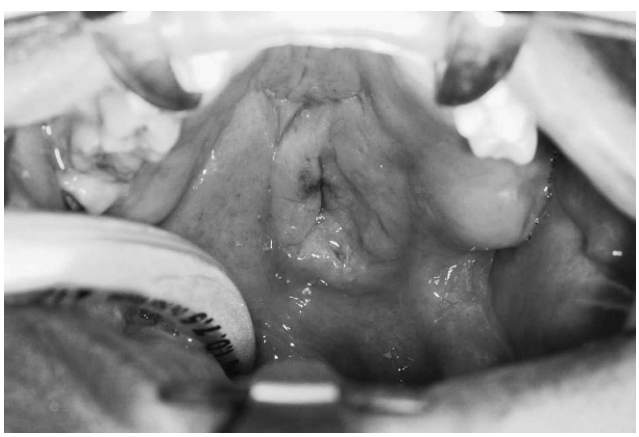

Figure 4. Extensive adenoid cystic carcinoma of the left palate.

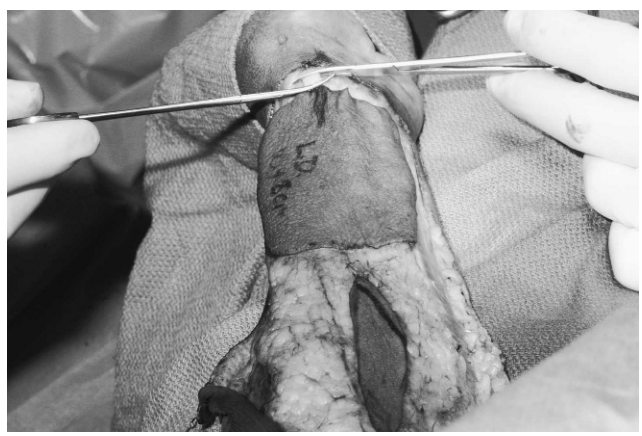

Figure 5. Elevation of a radial forearm free flap to reconstruct the surgical defect arising from extirpation of the tumor in Figure 4.

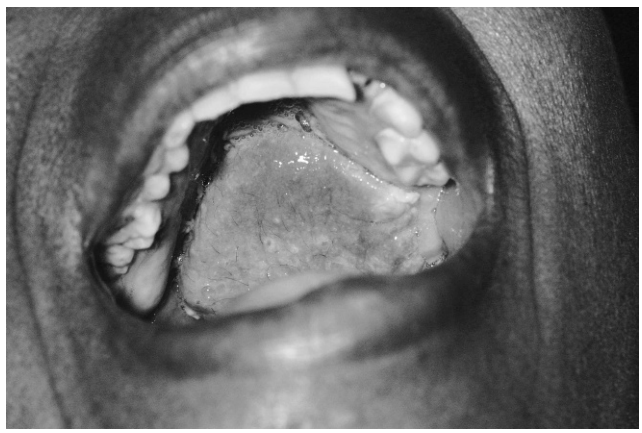

Figure 6. Postoperative appearance after free flap reconstruction of the infrastructure maxillectomy defect.

support a slight preponderance of lesions in females, with a peak incidence in the third through the fifth decades.[5] Despite their relative rarity among head and neck neoplasms, minor salivary gland tumors continue to generate notable academic interest, likely due to their potential for aggressive behavior.

Beckhardt and colleagues have identified several of the presenting features of minor salivary gland tumors of the palate. The presence of a submucosal mass with rare ulceration, dental numbness, and fixation of the lesion to underlying structures are signs and symptoms concerning for malignancy.[10] In the present study, we learn that, although most lesions are detected by patients as a swelling on the palate, many may go unnoticed until routine dental examination. The potential for malignancy and the frequent delays between detection and referral underscore the importance of vigilance on the part of our dental colleagues, as well as maintaining open lines of communication between dentists and head and neck surgeons. The presenting symptoms are often nonspecific for malignancy, although we did elucidate a statistically significant association between presenting complaints of pain and dysesthesias and a pathologic diagnosis of adenoid cystic carcinoma. Fortunately, most of these tumors are not overly aggressive, as delays in treatment typically parallel 3 or more years.[11]

Table 5. Average Length of Hospitalization by Reconstruction Method

Length of Stay (days)	Reconstruction Technique
< 1 day	Secondary intention
1.0	Primary closure
1.5	Local advancement
3.1	Palatal island rotation
3.75	Obturator
4.3	Remote pedicled flap (temporalis, submental)
9.4	Free tissue transfer

The evaluation of a patient with a minor salivary gland tumor begins with a thorough history and physical. Although the only widely accepted risk factor for salivary gland tumors is prior head and neck irradiation, no specific data exist regarding its import in palatal tumors. Previous authors have surmised a potential relationship between malignancy and tobacco use, but our data did not reveal a statistically significant association.[11] Radiographic imaging provides additional information regarding the local and regional extent of disease and also assists surgical planning for both resection and reconstruction. Plain films have been abandoned in favor of computed tomography scanning for accurate bone detail and magnetic resonance imaging to demonstrate soft tissue involvement and the degree of tumor encapsulation, if present.[5] Kurabayashi et al have identified several findings on computed tomography scan that are suggestive of malignancy: aggressive bone destruction, extension into the pterygopalatine fossa, and intratumoral calcification.[12] An accurate histopathologic diagnosis may then be sought through fine needle aspiration with excellent accuracy, sensitivity, and specificity, or through a more traditional incisional biopsy, ideally performed in the center of the lesion to minimize the likelihood of tumor seeding.[5,13]

Malignancy rates for minor salivary gland tumors of the palate vary from 35% to 82%, depending on the series.[4,5,14] This variability has been attributed to the patient populations and the inherent selection bias of the data sources which are often tertiary care referral centers, potentially skewing the numbers towards a perceived increase in the incidence of malignancy.[4] Some disagreement has arisen in the literature regarding the frequency with which certain neoplasms are encountered, as adenoid cystic carcinoma, adenocarcinoma, and mucoepidermoid carcinoma have each been proffered as the most common malignant tumor of the palatal minor salivary glands.[2,5,7,9,15] Other malignant tumors encountered include low grade polymorphous adenocarcinoma, carcinoma ex pleomorphic, acinic cell carcinoma, and undifferentiated carcinoma.[5] Ours is the first series in which low grade polymorphous adenocarcinoma emerged as the most common malignant tumor of the palatal minor salivary glands, followed by mucoepidermoid carcinoma and adenoid cystic carcinoma. As in the present work, the majority of benign minor salivary gland tumors of the palate are pleomorphic

adenomas, with scattered monomorphic adenomas and basal cell adenomas reported.[5,10]

The diverse histopathology of palatal minor salivary gland neoplasms presents a challenge to the head and neck surgeon in determining the adequate extent of resection. Traditional dogmas such as margins exceeding 1.5 cm may not be applicable, given the propensity of tumors such as adenoid cystic carcinoma and low grade polymorphous adenocarcinoma to invade along nerves in both antegrade and retrograde fashion.[16] Recent advances in tumor biology and molecular biology may eventually assist in determining which tumors are more likely to be aggressive.

For example, Carrillo and colleagues have demonstrated a statistically significant association between aneuploid DNA content as well as a high S-phase fraction and aggressive histological behavior.[17] Tumor-specific features have also been determined that may portend a more advanced local course or an increased likelihood of recurrence or metastasis. Although generally regarded as an indolent and locally invasive tumor since its initial description in 1984, low grade polymorphous adenocarcinoma may spread to regional lymphatics, transform into a more virulent histopathologic tumor, and occasionally lead to mortality through local spread or metastatic disease.[18] Tumors with greater amounts of papillary architecture, as well as those shown to overexpress *bcl*-2 and have a low proliferation index for Ki67, may have a more aggressive course, but this information is rarely, if ever, available intraoperatively.[19,20] Until ultrastructural and immunohistochemical analysis are rapidly available, resection of minor salivary gland tumors of the palate continues to rely on frozen section analysis.

Traditionally, the surgical management of palatal minor salivary gland tumors has been straightforward, if not dogmatic. Wide local excision and enucleation have been advocated for benign lesions, and wide local excision, if not hemimaxillectomy, has been the prevailing technique for malignant lesions. Surgical defects were reconstructed with local pedicled flaps for benign disease and often obturated in the setting of malignancy, citing a need for close surveillance of the tumor cavity for recurrence.[5] Similar to Beckhardt and colleagues, we advocate a flexible approach to tumors of the minor salivary glands in the palate. Benign tumors should be widely excised with a cuff of normal, healthy tissue and handled gently to avoid tumor spillage—enucleation may not be adequate. When the tumor appeared to grossly invade or encroach upon the bone of the palate, the bone was resected or widely exenterated with the drill. Malignant lesions should be removed completely in one attempt with an adequate margin of normal tissue, due to higher quoted rates of recurrence in lesions with positive margins or in those where the margins were first called positive but eventually declared negative.[10]

Truitt et al have outlined a foundation of transoral procedures for excising tumors of the palate, including palatectomy, alveolectomy, and the infrastructure maxillectomy.[3] In all but three of our patients, we were able to excise the tumor with adequate margins through a transoral approach. Three patients required external incisions: two for gross involvement of the nasopharynx and one for involvement of the ethmoid sinuses. A more conservative wide local excision served as a method to extirpate predominately benign tumors, and select low grade malignancies, such as low grade mucoepidermoid carcinoma. Partial palatectomy comprised the most commonly employed technique in our series, providing adequate margins of soft tissue and bone for a variety of benign and malignant lesions. For the potentially more aggressive histologic variants, infrastructure maxillectomy was performed, often in concert with dissection of the infratemporal fossa to the skull base.

Although we do not ascribe to a concrete definition of tumor margins, we define an ''adequate'' margin based on the underlying histopathology and apparent nerve involvement. We routinely biopsy the greater palatine nerve and send it for frozen section analysis, with the results of this specimen dictating additional dissection through the greater palatine foramen and then to the infratemporal fossa and skull base. Furthermore, we frequently sample the other sensory nerves in the infratemporal fossa if there is gross tumor extension into this anatomic region and if the greater palatine nerve biopsy proves positive. We attempt to resect malignant lesions with a 1 to 2 cm margin, although frozen section analysis of margins suffices in the infratemporal fossa and at the skull base when such margins are impossible to achieve without significant morbidity. Throughout the surgical resection, we attempt to closely follow sound oncologic principles and do not alter the extent of resection for reconstructive purposes.

Whenever possible, we advocate primary reconstruction of the palatomaxillary defect. Although we placed four intraoperative obturators in the present series, the reasons behind this decision remain unclear from the medical records. Palatomaxillary obturators have long been the standard for reconstruction in this region, but they have numerous shortcomings. In addition to being insensate, obturators are often described as uncomfortable and ill-fitting, particularly in the soft palate, making them less than ideal for palatal reconstruction.[21] The potential

for sensate reconstruction of such defects has been stressed by Urken, due to the complex functions of the palate in swallowing and speech.[22] Advances in reconstructive techniques have led to the introduction of a host of local and regional pedicled flaps for palatomaxillary reconstruction, including tongue flaps, uvular flaps, the palatal island flap, buccal flaps, temporalis myofascial flaps, submental flaps, and free tissue transfer.[23]

The paucity of wound complications in the present study is difficult to interpret, given the broad array of defects created. However, symptoms of velopharyngeal insufficiency appear more commonly, although without statistical significance, in patients whose extensive palatomaxillary and infratemporal fossa defects were managed with pedicled local flaps compared to those with similar defects who underwent free flap reconstruction. Although no such defects exist in the present study, scapular, iliac crest, and fibular osseocutaneous free flaps provide the potential for osseointegrated dental implants in defects that involve significant portions of the maxillary alveolus. For smaller defects, no benefit was gained from obturation in terms of shortened hospital stays and a more rapid return to a regular diet. Ultimately, all methods of reconstruction proved sufficient; and it is our assessment that the wound complications that arose are the result of poor flap choice. Larger defects involving significant portions of the maxilla and infratemporal fossa merit bulkier flaps than can be provided by the local advancement or the palatal island flap. However, smaller defects are particularly amenable to single stage, sensate reconstruction with a palatal island or submental flap.

Postoperatively, 6 patients received radiation therapy for adenoid cystic carcinoma and intermediate grade mucoepidermoid carcinoma. Our indications for radiation therapy parallel those of Beckhardt: advanced malignant histology, large lesions, perineural invasion, extensive minor nerve involvement, bone invasion, lymph node metastases, poor operative candidates, and in those who refuse surgery. Selection bias limits our cohort to surgical patients, and we cannot compare primary radiation therapy for management of minor salivary gland tumors of the palate with surgical resection.[10] Although commonly accepted as an adjuvant therapy in minor salivary gland tumors of the palate, its advantages have not been clearly delineated, and the concept remains controversial.[2,6,7,10,11]

Previous studies have documented recurrence rates for minor salivary gland tumors of the palate that exceed 50%, with adenoid cystic carcinoma exhibiting a tendency for delayed recurrence.[2,10] We only experienced one recurrence in our series, and that was a monomorphic adenoma which recurred at 3 months, likely reflecting inadequate initial resection. Our one mortality in a patient with carcinoma ex pleomorphic who refused postoperative radiation therapy on numerous occasions is not sufficient for meaningful statistical analysis of survival. Previous efforts have identified several risk factors in univariate and multivariate analysis for decreased survival, with 5- and 10-year actuarial survival estimated at 75% to 93% and 62% to 80%, respectively.[2,7] Aggressive histology, tumors larger than 3 cm, perineural invasion, bone invasion, and positive margins have emerged as risk factors for recurrence and mortality.[10] We acknowledge that the period of the study, with a maximum follow-up of 8 years, may not be sufficient to determine true rates of recurrence and mortality. However, we continue to follow patients on an annual basis to monitor their progress.

CONCLUSIONS

Minor salivary gland tumors of the palate are rare neoplasms. Tumors in this location are more likely to be malignant, and the presence of pain or locoregional dysesthesias should alert clinicians to the possibility of malignancy, especially adenoid cystic carcinoma. Nevertheless, a significant number of minor salivary gland tumors are asymptomatic and are picked up on routine dental examination, underscoring the importance of dentists in diagnosing and quickly referring these patients for definitive management.

Most benign tumors of the palatal minor salivary glands are pleomorphic adenomas that can be adequately resected with a cuff of normal tissue and a minimal risk of recurrence. Malignant tumors may require more aggressive resections, including partial palatectomy, infrastructure maxillectomy, and dissection to the skull base through the infratemporal fossa. Frozen section control of margins and assessment of the sensory branches of the trigeminal nerve, particularly the greater palatine nerve, are required for local control. Defects may be reconstructed primarily, and an array of techniques, including free tissue transfer, is effective.

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